Claims

Claims 1 through 6: *Canceled*

Claim 7. *(Currently amended)* A magnetoresistive spin valve sensor comprising:

a substrate;

a fixed ferromagnetic layer formed on the substrate and having its magnetization direction pinned ~~in a preferred direction~~ in the absence of an applied magnetic field;

a nonmagnetic metallic electrically conducting spacer layer in contact with the fixed ferromagnetic layer; and

a free ferromagnetic layer in contact with the spacer layer and having its magnetization direction free to rotate relative to the magnetization direction of the fixed ferromagnetic layer; and wherein at least one of the fixed and free ferromagnetic layers comprises first and second ferromagnetic films antiferromagnetically coupled to one another and an antiferromagnetically coupling film located between and in contact with the first and second ferromagnetic films and having a thickness sufficient to couple the first and second ferromagnetic films together with their magnetic moments oriented antiparallel to one another, the antiferromagnetically coupling film being formed of a material consisting essentially of Ru and Fe and having a composition $Ru_{100-x}Fe_x$ wherein x is between approximately 10 and approximately 60 atomic percent.

Claim 8. *(Currently amended)* A magnetic tunnel junction device comprising:

a substrate;

a fixed ferromagnetic layer having its magnetization direction fixed ~~in a preferred direction~~ in the absence of an applied magnetic field;

an insulating tunnel barrier layer in contact with the fixed ferromagnetic layer; and

a sensing ferromagnetic layer having its magnetization direction free to rotate relative to the magnetization direction of the fixed ferromagnetic layer and in contact with the insulating tunnel barrier layer; and wherein at least one of the fixed and sensing ferromagnetic layers comprises first and second ferromagnetic films antiferromagnetically coupled to one another and an antiferromagnetically coupling film located between and in contact with the first and second ferromagnetic films and having a thickness sufficient to couple the first and second ferromagnetic films together with their magnetic moments oriented antiparallel to one another, the antiferromagnetically coupling film being formed of a material consisting essentially of Ru and Fe and having a composition $Ru_{100-x}Fe_x$ wherein x is between approximately 10 and approximately 60 atomic percent.